There are no translations available.

Senses: Touch and Vision

Brain's Object Recognition System Activated by Touch Alone

Portions of the brain that activate when people view pictures of objects compared to scrambled images can also be activated by touch alone, confirms a new report published online on May 28th in Current Biology.

"That's the nub of the paper," said Harriet Allen of the University of Birmingham. "Part of the brain is for object processing irrespective of the sensory input coming in."

The discovery was made by studying a man, known as HJA, with a condition called visual agnosia after suffering a stroke that left a large bilateral lesion in part of the brain important for object recognition, specifically in the lateral occipital cortex (LO). As a result, although HJA was not blind, he could not process visual input normally; objects appeared to him as unrecognizable jumbles.

"It's difficult to imagine," Allen said. "If he looked at a pen, he might see lines, but he couldn't say which were the pen and which weren't." However, HJA could still

recognize everyday objects by grasping them, they show.

In the study, the researchers had HJA and control participants observe pictures of objects and scrambled images while they were being scanned by fMRI, which measures brain activity based on changes in blood flow). Participants were also scanned while they touched objects with one hand.

Within a subset of the regions found in control participants, HJA showed activity only for tactile objects, they report, suggesting that these regions are specifically involved in successful multi-modal recognition. The results show that activation of dorsal LO by tactile input is not secondary to visual recognition. Rather, it can operate directly through the sense of touch.

"Our data indicate, for the first time, that at least some regions in the LO can be activated normally from touch, even when input from ventral LO is lesioned and visual recognition is prevented," the researchers wrote. "This is consistent with estimates of effective connectivity from fMRI that have implied that there are direct connections between somatosensory cortex and LO."

When asked to recognize objects based on touch, early blind participants also show activation in similar brain regions, earlier studies have shown. However, they said, in those who are blind the LO may be recruited to process information differently than it does in sighted people. "Here we provide evidence for dorsal LO activation being driven, in part, directly from touch in a normally developed brain."

Sources

Cell Press, May 28th, 2009 in Medicine & Health / Neuroscience http://www.physorg.com/news162744208.html